

CHAPTER 2.0 HARDWARE THEORY OF OPERATION

2.1 Introduction

The radio contains three Circuit Card Assemblies (CCAs). The Control CCA and Keypad CCA are contained in the Chassis Assembly, and the Transceiver CCA which is attached to the rear panel. The CCAs are attached to each other and to other radio components through 32-pin, wire, and flexi connectors. Figure 2-1 contains the Guardian Interconnection diagram.

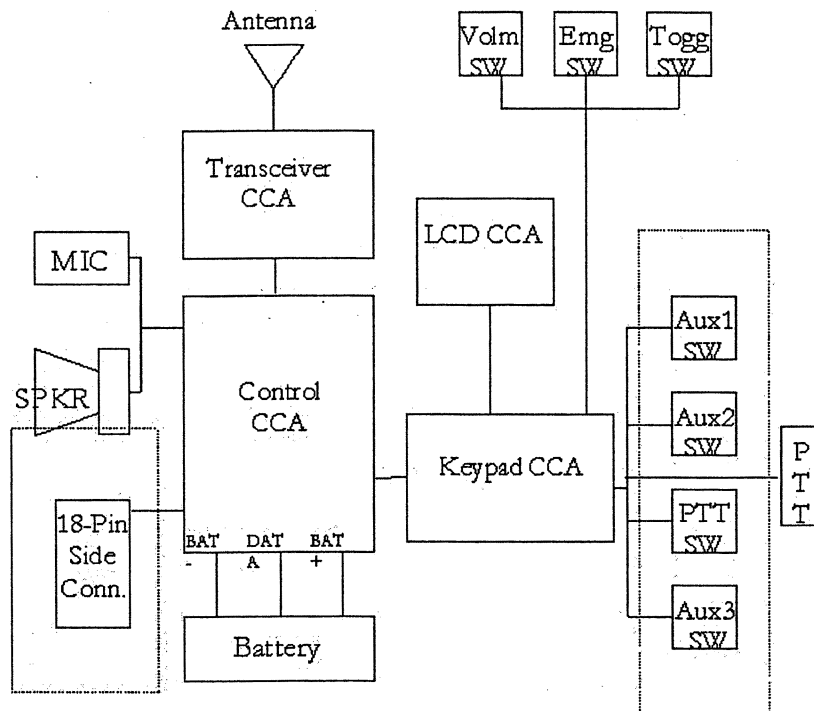


Figure 2-1 Guardian Interconnect Diagram

2.2 Control Board

The control board fits interfaces to the keypad board, transceiver board, internal audio, and side connector. The board implements the main radio control function and all the baseband signal processing. Figure 2-2 shows a block diagram of the Control Printed Circuit Board (PCB). The Control CCA schematic is contained in the schematic section at the back of this document

2.2.1 Power Supply Unit

This block of circuitry takes the raw battery supply voltage and the external power source from the side connector together with a number of control signals to generate a number of power supply outputs. Figure 2-3 shows a block diagram of the Power Supply Unit.

2.2.1.1 Battery/External Power Switching

This block of circuitry generates the 10V CONT supply from either the battery or external power source. In normal operation with a battery, the FPGA sets /BATOFF to connect the battery through to 10V CONT (at power-up the reverse path diode operates before BATOFF is set). In this mode of operation, power from the battery for external ancillaries is available when the radio is switched on through 500mA current limiter. In operation without a battery but with an external power source, power is routed from the external power source through to the 10V CONT line. This input is protected by an overvoltage detector, which switches off this path if the external voltage exceeds 16V.

In the situation where there is an external power source and a battery fitted, the H8 software detects the situation by sensing a battery through the battery serial bus and an external power source through the WRU line. In this situation the software then controls /BATOFF to prevent the external power source damaging the battery.

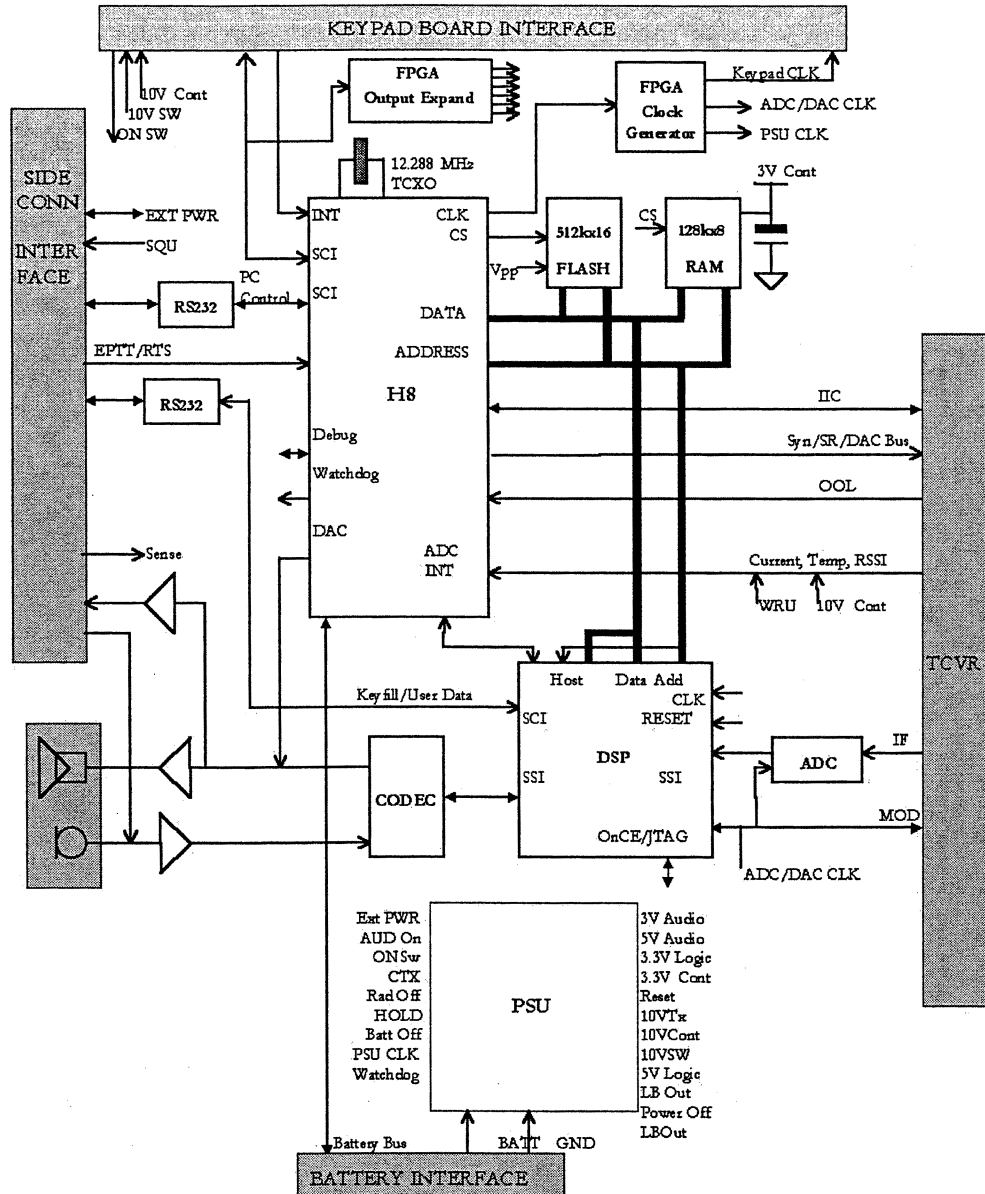


Figure 2-2 Guardian Control Board

2.2.1.2 On/Off Switching

The main continuous supply 10V CONT is passed through an on-off switch to generate 10V SW, the main radio supply. In normal operation with a battery the on/off switching is controlled by the radio on/off rotary switch by the control /RADON. Once switched on the main controller can hold the radio on by setting PWRHOLD. In addition to the radio rotary on/off switch, the on/off switching can be controlled by the external line /RADOFF. This line overrides the /RADON line and can be used to force the radio off regardless of the rotary switch setting. However, the PWRHOLD and PWROFF lines can be used by the H8 controller to implement a clean controlled switch off.